

**CLAIMS:**

1. A shift gate position determining system for a vehicle transmission comprising:
  - a base portion supporting an engaging portion;
  - at least one shift gate to be engaged with and to be disengaged from the engaging portion, the at least one shift gate defining a vehicle shift stage;
  - a movable member being movable to engage the at least one shift gate with the engaging portion and to disengage the at least one shift gate from the engaging portion;
  - an actuator for moving the movable member in a direction for engaging the at least one shift gate with the engaging portion and for disengaging the at least one shift gate from the engaging portion; and
  - the at least one shift gate including:
    - a stabilizing range for stabilizing an engagement between the engaging portion and the at least one shift gate,

wherein the system stops movement of the movable member by driving the actuator and determines a portion at the movable member as a shift gate reference position at a time when the movement of the movable member stops, and

wherein the system moves the movable member by driving the actuator, stabilizes the engaging portion in the stabilizing range, and determines the stabilizing position of the engaging portion as a position of the at least one shift gate.
2. A shift gate position determining system for a vehicle transmission according to claim 1, wherein the actuator is driven to intermittently move the movable member so as to position the engaging portion in the stabilizing range.

3. A shift gate position determining system for a vehicle transmission according to claim 2, wherein the activation of the actuator stops when the movable member is moved, and the activation of the actuator starts when the movement of the movable member is stopped.

4. A shift gate position determining system for a vehicle transmission according to claim 3, wherein the stabilizing range has a groove, and the engaging portion is engaged with and disengaged from the groove in response to the movement of the movable member.

5. A shift gate position determining system for a vehicle transmission according to claim 4, wherein the groove has a V-shaped cross section.

6. A shift gate position determining system for a vehicle transmission according to claim 5, wherein the shift gate reference position is determined by impacting the movable member with the base portion.

7. A method of determining a shift gate position for a vehicle transmission comprising a base portion supporting an engaging portion, at least one shift gate to be engaged with and to be disengaged from the engaging portion, the at least one shift gate defining a vehicle shift stage, a movable member being movable to engage the at least one shift gate with the engaging portion and to disengage the at least one shift gate from the engaging portion, an actuator for moving the movable member in a direction for engaging the at least one shift gate with the engaging portion and for disengaging the at least one shift gate from the engaging portion, and the at least one shift gate including a stabilizing range for stabilizing an engagement between the engaging portion and the at least one shift gate, the method of determining a shift gate position for a vehicle transmission comprising the steps of:

determining a shift gate reference position;  
controlling driving force outputted from the actuator;  
judging whether the engaging portion is within the stabilizing range of the at least one shift gate;  
controlling the driving force to be outputted from the actuator when the engaging portion is within the stabilizing range of the at least one shift gate;  
judging whether the movable member has moved;  
temporarily determining a position of the movable member as a position at the at least one shift gate when the movable member has not moved;  
judging whether a distance between the shift gate reference position and the position at the at least one shift gate is within a predetermined range; and  
~~determining the position of the movable member as the position at the at least one shift gate when the distance is within the predetermined range.~~

8. A method of determining a shift gate position for a vehicle transmission according to claim 7, further comprising the steps of:

judging whether the engaging portion is positioned at a side of the shift gate reference position relative to the at least one shift gate when the engaging portion is not positioned in the stabilizing range of the at least one shift gate;

judging whether the movable member has moved in order to guide the engaging portion towards the stabilizing range of the at least one shift gate when the engaging portion is positioned at the side of the shift gate reference position relative to the at least one shift gate;  
and

outputting the sufficient driving force from the actuator in order to move the engaging portion in the stabilizing range when the movable member has not moved in order to guide the engaging portion towards the stabilizing range.

9. A method of determining a shift gate position for a vehicle transmission according to claim 8, further comprising:

controlling the driving force outputted from the actuator when the movable member has moved in order to guide the engaging portion towards the stabilizing range.

10. A method of determining a shift gate position for a vehicle transmission comprising the at least one shift gate having at least a first shift stage and a second shift stage, the method of determining the shift gate position according to claim 9, further comprising the steps of:

determining a temporary position at the second shift stage with reference to the position at the at least one shift stage, the position at the at least one shift stage being the position at the first shift stage;

judging whether a current position of the movable member is within a range of the second shift stage;

controlling the driving force outputted from the actuator when the current position of the movable member is within the range of the second shift stage;

judging whether the movable member has been stationary; and

determining the temporary position of the second shift stage as a position of the second shift stage.

11. A method of determining a shift gate position for a vehicle transmission according to claim 10, wherein the driving force outputted from the actuator (8) is controlled to be zero.

12. A method of determining a shift gate position for a vehicle transmission according to claim 11, wherein the stabilizing range has a groove, and the engaging portion is engaged with and disengaged from the groove in response to the movement of the movable member.

13. A method of determining a shift gate position for a vehicle transmission according to claim 12, wherein the groove has a V-shaped cross section.

14. A method of determining a shift gate position for a vehicle transmission according to claim 13, wherein the shift gate reference position is determined by impacting the movable member with the base portion.